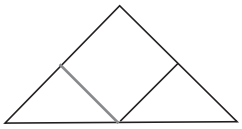
Barrier Games

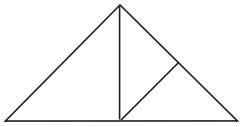
Purpose

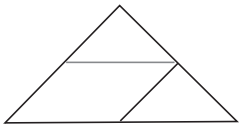
Students will understand and use correct mathematical terminology and develop new terminology to describe shapes, position and orientation. Students will develop listening skills.

Initial Task



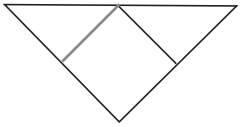
Begin by drawing the three piece triangle to the right and then ask the students to try to describe it. Write the suggestions on the board. Ask if the description may be improved and if so how. Students may be given a copy of the vocabulary list for support.





Draw two other three-piece triangles.

Ask the students to explain how they are the same and how they differ?



Draw another three piece triangle and ask the same questions.

Ask the students draw a simple shape made from three Tangram pieces. Ask some students to describe the shape. Write the descriptions down.

Assessment

- Analyse which parts of the descriptions are better than others.
- Which descriptions are ambiguous/precise?
- Discuss various mathematics vocabulary that will assist. (See Vocabulary list.)

Playing Barrier Games

- A game for two players.
- This game requires a Tangram for each player and a barrier.

Rules

One player secretly (behind the barrier) builds a figure using some pieces from the Tangram and then describes how to make the shape. The other player tries to build the figure from the description.

Players swap roles.

Variations

- Allow the builder to ask clarifying questions as the building takes place or restrict the number of questions to be asked.
- Allow the person describing the building to look over the barrier to see whether the builder is interpreting the instructions in the correct way – or do not allow this.
- Make the students sit back to back. This will alter the orientation.
- Ask the describer to provide written, step-by-step instructions rather than verbal instructions.

Vocabulary Associated with Shape

The following is a list of words that students may use when playing barrier games or discussing shapes. Students might like to add to this list.

Represent Shape (What is it?)

acute angle, acute/obtuse/right triangles,
angles, apex
base
curve
dimensions
edge, equilateral/isosceles/scalene
triangles
faces, flat
irregular
parallel, perpendicular, point, polygons,
properties
quadrilateral
regular, right angle
sides, surface, symmetrical
vertex, vertices

Location, Position (Where is it?)

angles, anti-clockwise, around, axis
backwards, before, behind, below,
beneath, beside, between, bottom,
boundary
clockwise, close to, columns, co-ordinates
diagonal, distance, direction
East
full turn
forwards
horizontal
in front of, inside
left
near, next to, North
oblique, opposite, orientation, outside, over
position, proximity
quarter
right
South, straight ahead
three quarters, top
under
vertical
West

Represent transformation
(How does the shape move or change?)

anti-clockwise, around, arrangements
back, bisect
clockwise, congruent, copy
enlarge
flip, fold line, forward
half turn
intersection
line of symmetry
mirror image, multiple copies
pattern
quarter turn
reduce, reflect, repeat, repeated patterns,
repetitive, rotate
scale, slide, symmetrical
tessellate, transform, transformation, turn
up

Note: *This list of words is not exhaustive but rather a sample of Space related words*

Teacher Tips

- Rather than simply copy these words onto a chart, encourage the students to create charts in groups and then a large class chart of words may be created and put on display.
- Students can add to the chart as they work with Tangrams.
- Never assume that just because students use particular words that they know what they mean or understand them.
- Encourage the students to use the words on display.

Assessment idea

Monitor whether the students' mathematical vocabulary grows.